

Filling the Gaps: Numbers of Black PhD recipients in Mathematics

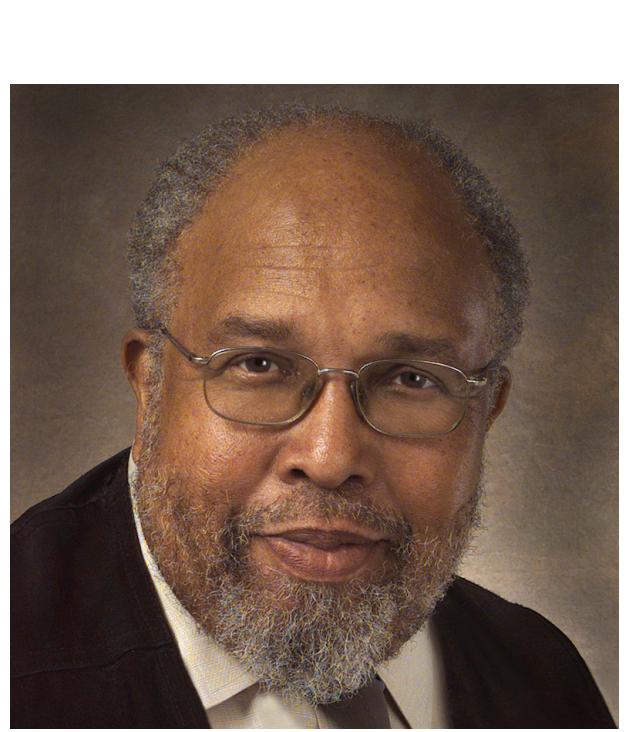
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MADDER: Mathematicians of the African Diaspora Database's Ensemble of Researchers

Abstract

We set out to count the number of Black PhD recipients of a doctoral degree in mathematics from a US institution because no one has ever compiled a comprehensive list. In 1925, Elbert Frank Cox was the first Black person to receive a PhD in mathematics. Our research begins with Cox and goes all the way to the present day. We scoured university websites, the Math Genealogy Project, Wikipedia, and the archived Mathematicians of the African Diaspora website in order to begin making our list. We want future researchers to access a central location for this information. Black mathematicians are made invisible by time and we want the crucial work of existing Black mathematicians to be recognized.

Mathematicians of the African Diaspora (MAD Pages)



Scott W. Williams

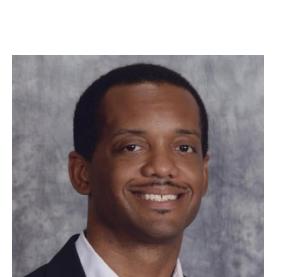
Williams introduced the site in 1997. There are more than 1,000 pages featuring Biographies and Stories. [He stopped updating them in 2008](#).

Updated MAD Pages



Don King

Asamoah Nkwanta



John Weaver

<https://www.mathad.com/home>

Goins, King, Nkwanta, and Weaver have been working since 2010 to update the Pages. [There are 800 names in the MAD Pages Database](#).

Timeline of MAD Pages

| 1997 | 2015 | 2021 |
|--|--|--|
| <ul style="list-style-type: none"> Scott Williams (SUNY Buffalo) finds the website "Mathematicians of the African Diaspora." The MAD pages feature over 700 African American scholars and scientists in math, computer science, and physics. | <ul style="list-style-type: none"> Edray Goins (Pomona College), Donald King (Northeastern University), Asamoah Nkwanta (Morgan State University), and Weaver (Varsity Software) begin working to update the MAD pages. | <ul style="list-style-type: none"> Edray Goins and Robin Wilson (Cal Poly Pomona) led a research group of 13 undergraduates during the 2021-22 academic year to write biographies for the new MAD Pages called MADDER: Mathematicians of the African Diaspora's Ensemble of Researchers |

Our Question

Our subgroup within MADDER is trying to answer one seemingly simple question: [How many Black recipients of a doctorate in mathematics from a US institution are there?](#)

Process

- We started by looking at the information provided in the Wikipedia site: "List of African-American mathematicians" (1925-1975). We kept count of how many men and women earned a PhD in mathematics each year and input the numbers into a Google spreadsheet.
- Next, we looked at the corresponding years from MAD pages and input the names and numbers into the spreadsheet.
- We researched any discrepancies between the Wikipedia and MAD pages to find what information either database was missing.
- We were unable to filter information before 1948 on MAD Pages so further research can be done to verify the data.
- To continue our research for 1981 to present, we used the NCSES Database (see section below). We used a filter feature on the website to separate by men, women and year. We input these numbers into the spreadsheet.
- To cover the gap from 1976 to 1980, we used MAD Pages.
- We are still searching for other sources for cross referencing and confirming the data.

NCSES

To gather information on the number of PhD recipients to Black Mathematicians, we used the National Center for Science and Engineering Statistics (NCSES) Survey of Earned Doctorates. Going as far back as 1981 to present, the NCSES has built in parameters that can filter out degree level, major, race, ethnicity, sex, and years to build charts or tables with. For this study, our focus is on Black men and women who have earned doctoral degrees for Mathematics and Applied Mathematics. Unfortunately, the NCSES does not have demographical information such as ethnicity, race, gender, or sexual orientation pre-1980.

Motivating Questions

Where do we find the data?

Wikipedia [4], the original MAD Pages [5], Math Genealogy [6], and the NCSES Survey of Earned Doctorates [7].

How do we know the Wikipedia list is complete?

We don't. For example, some of the people who are listed on the MAD pages as having a PhD in math are listed on Wikipedia as having a PhD in mathematics education. This is why we are in the process of manually verifying all of the names in Wikipedia with the original MAD pages, the Math Genealogy Project, and university websites.

Are there more ways we can find data?

Email Mathematics Departments.

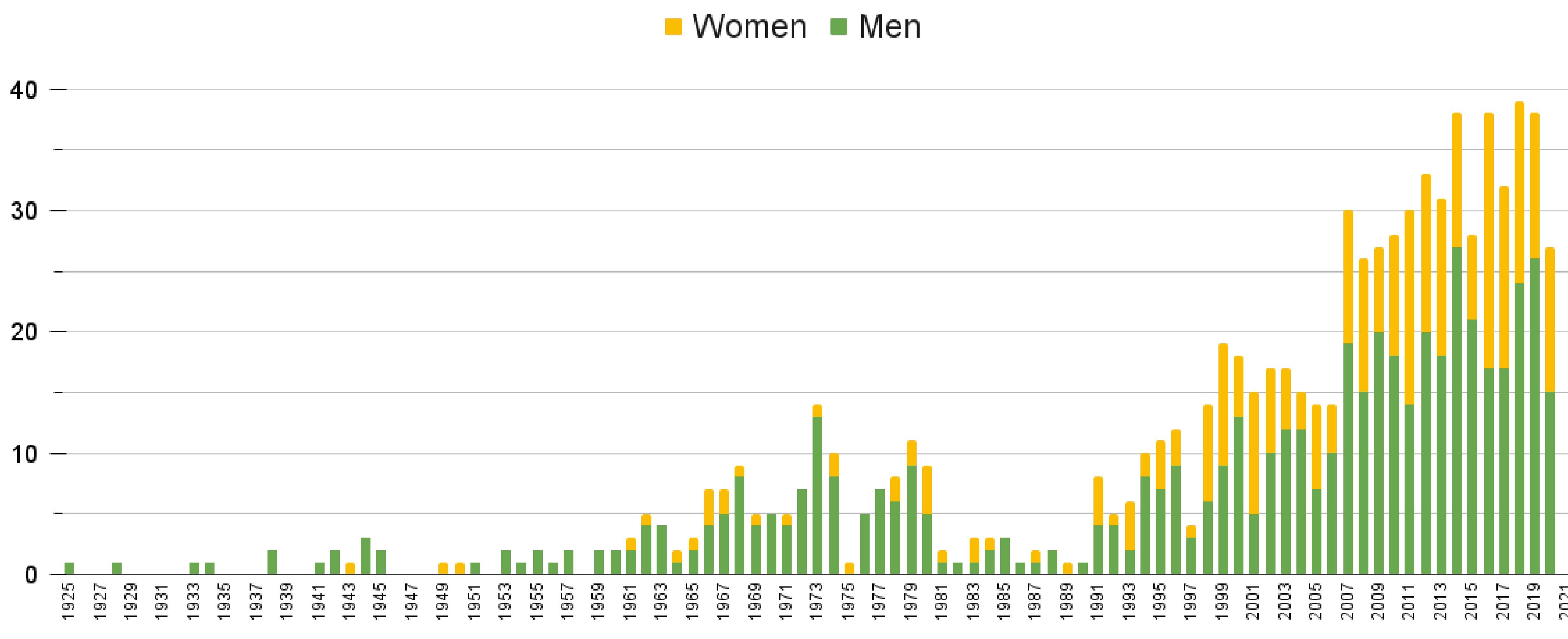
Where do we find complete data before 1980?

The NCSES Survey of Earned Doctorates did not record data about race or gender pre-1980. So we have to compile data from 1925-1980 from Wikipedia's List of African American Mathematicians, the Math Genealogy Project, and university websites.

Next Steps for Verifying Data

- From 1980 onward, we only have numbers of Black PhD recipients because that is the year that the NCSES Survey of Earned Doctorates began keeping track of ethnicity. We need to add names to these numbers so that we can verify them with the MAD Pages.
- We are still in the process of checking all the data. For each year, we are going through and manually checking to see if the names in Wikipedia's List of African-American Mathematicians aligns with the names in the MAD Pages. We are also trying to find a third source of information to confirm the number and year of the PhD recipients. Examples of this third source include the information directly from a university website or from the Math Genealogy Project, which records data about mathematical researchers.
- Verification is important because of some issues we've encountered. For example, there are mathematicians in the MAD pages who are not in the Wikipedia list and vice versa.

Number of Black Men and Women who Received a PhD in Mathematics in the US



MAD Database's Ensemble of Researchers (MADDER)

Edray Goins (Pomona College) and Robin Wilson (Cal Poly Pomona) received funding from the Center for Undergraduate Research in Mathematics (CURM) to have students to participate in research assistantships for the academic year.

Goals

- Researching and Writing Biographies** (2 hours a week)
Verify information in the biographical narrative, and interview individuals whenever possible.

- Database Quality Control** (1 hour a week)
Update database information for individuals already profiled in the database, and add new profiles not currently in the database.

- Weekly Research Meeting** (2 hours a week)
Students will (a) give progress reports on the profiles updated, (b) exchange with other students the drafts of written biographies, and (c) discuss assignments of names for the coming week.

MADDER Research Subgroups

- Subgroup #1: Black Women in Mathematics**
Natasha Arnold, Tianna Couch, Brandon Douglas, Tadius Frank, and Christina Marsh; led by Robin Wilson

- Who are the first African American Women to earn PhDs in Math?**

- Subgroup #2: Black PhDs in Mathematics from 2000 - Present**
Dante Christian, Virgil Munyemana, and Erin Sewell; led by Edray Goins

- Who are the recent African Americans to receive PhDs in the Math?**

- Subgroup #3: Numbers of Black PhDs in Mathematics**
Daniel Agbeo, Kamil English, Reia Li, and Devon Woodfine; led by Goins

- What are the numbers of African Americans to receive PhDs in Math?**

References

- [1] Taryn Butler Lewis, Tasha R. Inniss, Monica Jackson, and Calandra Tate Moore. *An Unlikely Cohort: Disrupting the Stereotypes about Mathematicians and their Careers*. <https://dx.doi.org/10.1090/noti2431>
- [2] Patricia C. Kenshaft. *Black Women in Mathematics in the United States*. <https://doi.org/10.2307/2320508>
- [3] Erica Walker, Scott Williams, and Robin Wilson. *An Existence Proof: The Mathematicians of the African Diaspora Website*. <https://blogs.ams.org/inclusionexclusion/2019/01/31/mathematicians-of-the-african-diaspora/>
- [4] List of African American Mathematicians. https://en.wikipedia.org/wiki/List_of_African-American_mathematicians
- [5] Mathematicians of the African Diaspora (MAD Pages). <http://www.math.buffalo.edu/mad/>
- [6] Mathematics Genealogy Project. <https://genealogy.math.ndsu.nodak.edu>
- [7] National Center for Science and Engineering Statistics (NCSES). <https://ncsesdata.nsf.gov/home>

Acknowledgements

- Dr. Edray Herber Goins (Pomona College)
- Dr. Robin Wilson (Cal Poly Pomona)
- Department of Mathematics and Statistics, Pomona College
- Department of Mathematics, Cal Poly Pomona
- Center for Undergraduate Research in Mathematics (CURM)
- National Science Foundation (DMS-1722563)